

were no reports received north of the position of this vessel, and therefore it was impossible to locate the center of the low, although from the direction of the wind, the S. S. *United States* must have been well in the southern quadrants, especially as a number of vessels from 250 to 300 miles to the southward experienced light to moderate winds, with comparatively high barometric readings. From the 19th to the 25th there were no disturbances of any consequences over the ocean, although during part of that period a slight depression existed off the coast of northern Europe. On the 26th the Province of Quebec was surrounded by an area of low pressure of slight intensity, and on the same day a second low was central near Aberdeen, Scotland, where the barometric reading was 29.07 inches.

Neither of these disturbances was accompanied by heavy weather, and light to moderate winds prevailed over the entire ocean. During the next two days the European low remained nearly stationary in position, gradually filling in. On the 28th reports were received from vessels not far from the French coast showing that moderate westerly gales prevailed in that section, although a number of other craft not far away encountered only moderate winds.

The number of days on which fog was reported was considerably below the normal on the Banks of Newfoundland and over the northern steamer lanes, while fog was somewhat more frequent than usual off the Virginia and North Carolina coasts, as well as in northern European waters.

NOTES ON WEATHER IN OTHER PARTS OF THE WORLD.

British Isles.—In August, as in the two preceding months, the rarity of thunderstorms formed a continuing feature in a manner which was characterized in other respects by a large amount of disturbed weather. The general rainfall, expressed as a percentage of the average, was as follows: England and Wales, 85; Scotland, 86; Ireland, 81; British Isles, 86.—*Symons's Meteorological Magazine, Sept., 1919, p. 98.*

*France*¹.—L'Orient, August 30, 1919. The coast of Brittany for miles north and south of here is strewn with wreckage thrown on shore during the great storm which prevailed yesterday. At Locqueltas a lifeboat and wreckage, apparently from an American merchant ship,

was washed ashore. The name of the boat could not be deciphered. The storm is abating today.—*N. Y. Eve. Post, Aug. 30, 1919.*

Argentina.—Buenos Aires, August 12, 1919. Efforts to transport passengers over the trans-Andine mule train route again have been abandoned on account of snow. Only mails are now being carried across the mountains.—*Washington Eve. Star, Aug. 13, 1919.*

Australia.—Melbourne, August 27, 1919. Heavy rains have fallen over the wheat belt of New South Wales and Queensland, [breaking a drought and] giving promise of heavy crops from those sections of the country.—*N. Y. Eve. Post, Aug. 28, 1919; [and Hobart, Tas., Mercury, Aug. 20, 1919].*

¹ See also note published in MONTHLY WEATHER REVIEW, July, 1919, p. 501.

DETAILS OF WEATHER OF THE MONTH IN THE UNITED STATES.

CYCLONES AND ANTICYCLONES.

The great majority of the *cyclones* which traversed the North American continent passed eastward between the Great Lakes and Hudson Bay. A single cyclone moved northeastward along the Atlantic coast and gave rise to the heavy local downpours as noted in a previous paragraph. None of the cyclones was of unusual intensity.

Eight *anticyclones*, mostly of the Alberta type and four of the North Pacific type, moved east-southeast during the month. The number and movement of both cyclones and anticyclones was closely in accord with the normal expectation.

THE WEATHER ELEMENTS.

By P. C. DAY, Climatologist and Chief of Division.

[Dated: Weather Bureau, Washington, Oct. 1, 1919.]

PRESSURE AND WINDS.

The distribution of the mean atmospheric pressure over the United States and Canada, and the prevailing direction of the winds for August, 1919, are graphically shown on Chart VII, while the means at the several stations, with the departures from the normal, are shown in Tables I and III.

August, like the preceding month, was without marked fluctuations in atmospheric pressure, and the high and low areas were of the usual summer type, frequently without distinctive progressive movement. Moderately high pressure dominated northern districts east of the Rocky Mountains during the first few days of the month and again the latter part of the first and the early portion of the second decades. West of the Rockies, particularly

near the Pacific coast, high pressure, usual to the summer season, prevailed almost continuously during the first half of the month, and it was only occasionally displaced in the latter half. During this period of the month in the districts to eastward of the Rocky Mountains pressure was highest over the southeastern States, although there was no marked change from the conditions normal to the period of the year.

Pressure was moderately low over southern districts during the early part of the month, although no distinctive storm center developed in that region until about the 12th, when falling pressure off the Florida coast indicated the development of a low area to the eastward, which, by the morning of the 13th, appeared as a storm of considerable energy off the Virginia coast. This storm moved to the Canadian maritime provinces within the following 48 hours, attended by high winds and local heavy rains along the immediate coast from the Carolinas to southern New England.

About the middle of the month low pressure moved into the northern border States to westward of Lake Superior, and during the following few days advanced eastward into New England and the Canadian maritime provinces, but lost energy as it approached the coast. This was quickly followed by another low area, which took a similar course and likewise dissipated as it moved toward the New England coast. The latter part of the month was without any material storm development, although near the close a considerable area of rain had overspread the districts to eastward of the Mississippi River.

The average pressure for the month was below the normal over a narrow area along the northern border from eastern Washington to Lake Superior and thence eastward to the Canadian maritime provinces and

southeastward to the middle Atlantic coast. Over all southern districts, and from the great central valleys westward to the Pacific, the average pressure for the month was below the normal; however, the departures both above and below were small in practically all cases.

In the absence of any well-defined storm areas, high winds were exceptional and few velocities above 50 miles per hour were recorded. This was particularly noticeable in the districts from the Mississippi Valley westward to the Pacific. The excess of pressure over southern districts favored a northward drift of the atmosphere, particularly from the Great Plains eastward, where winds with southerly components were the rule, save in portions of the upper Lakes and to the westward, where they were frequently from northerly and westerly points. In the mountain regions and thence west to the Pacific, westerly winds were prevalent, particularly where the direction was not influenced by local topography.

TEMPERATURE.

In the absence of any marked departure of the pressure distribution from that usual to a summer month, no great extremes of either warm or cool weather persisted for lengthy periods, and the month as a whole showed relatively small ranges in temperature.

The warmest period of the month in the great central valleys was about the middle of the first decade, at which time pressure was moderately high in the Gulf States and diminishing northward, thereby inducing warm southerly winds from the Gulf to the Canadian boundary. In the far western districts the warmest periods were generally after the middle of the month; in fact, the entire latter half of the month was decidedly warm in portions of California, particularly in the Great Valley, where the continued heat and drought forced the ripening of fruits, and the gathering of raisin grapes began 10 days to two weeks earlier than usual. In portions of the northern Rocky Mountains the warmest period of the month was at the close.

Cool weather prevailed over the Pacific coast districts at the beginning of the month and over the Northeastern States about the end of the first decade. Generally moderate temperatures prevailed throughout the second and the early part of the third decades, after which the coolest weather of the month occurred in most districts. Over the Southwestern States the 22d to 24th were the coolest days, while in the Southeastern States the 27th to 29th were quite cool. Over much of the Middle West the last two days of the month were the coolest.

Maximum temperatures were above 100° at some period of the month in practically all the States to westward of the Mississippi, and generally in the Central and Southern States to the eastward. In the Lake region and over the coast States from North Carolina to New England the maximum temperatures were somewhat less than 100°. The highest temperature reported during the month, 123°, was observed at Greenland Ranch, a station in one of the arid, depressed valleys of southeastern California. Temperatures of 110° and 113° were observed in the southern plains region and they were above 105° at points in the far Northwest.

The lowest temperature reported during the month was 14° at a point in the mountains of Montana, and temperatures below freezing were observed very generally throughout all the western mountain regions. To the eastward minimum temperatures below freezing were reported at exposed points in North Dakota, the upper

Lake region, in the highlands of northern New York, and the interior of New England. Some light frosts were reported at exposed points in the more Northern States, but no damage occurred.

The average temperature for the month was not materially different from the normal in any section, but as a whole the month was warmer than that usually experienced in August over the greater part of the country. In certain States of the middle Plateau the average temperature for each of the five months, April to August, inclusive has been above normal.

PRECIPITATION.

The precipitation during the month was received mainly as local showers, resulting in large variations over restricted areas. The month opened with unsettled, rainy weather over the central and southern Mountain and Plateau regions, particularly in Arizona, where heavy falls were reported, and in the central and northern districts east of the Mississippi River. By the middle of the first decade rains had been rather frequent in north-central and eastern districts, and local showers had occurred in the middle Gulf States, particularly in western Florida, where about the 3d or 4th nearly 10 inches fell within 24 hours. Toward the latter part of the first decade showers were general over the upper Mississippi Valley and in the Middle Atlantic coast States and also at points in the South, Southwest, and Northwest, unusually heavy rains being reported from points in Colorado. Early in the second decade, heavy rains occurred over the east Gulf and portions of the Atlantic coast States, in connection with the northward movement of the only important low-pressure area that was observed during the month. At Savannah, Ga., a total of nearly 5 inches was measured within a period of two hours, the heaviest rate of fall ever experienced at that place. Farther north the same storm gave Atlantic City, N. J., a total of nearly 9 inches, the rate of fall at that place likewise being the greatest of record. At the same time well-distributed and generally copious rains occurred over the northern Plains, and extending eastward covered the upper Mississippi Valley, Lake region, Ohio Valley, and the adjacent regions eastward and southward.

The latter part of the second decade was marked by generally unsettled and showery weather east of the Great Plains with local heavy falls at widely scattered points.

At the beginning of the third decade rains were general in the eastern portion of the Plains States and over the Mississippi Valley, extending into most eastern districts by the morning of the 22d, with some heavy falls in eastern Texas and the lower Mississippi Valley. On the following day some heavy rain and thunderstorms occurred in the central portion of Arizona, much damage to standing crops and buildings being reported. The greater part of the last decade was without material precipitation to westward of the Mississippi, except about the 27th and 28th, when some heavy rains occurred in the Central Plains region. East of the Mississippi local rains were frequent in some of the Southern States during the last decade, and the last two or three days were generally rainy over the more eastern districts.

The monthly precipitation was heavy along the Atlantic coast and also over most of the Gulf States, where the amounts ranged generally from 4 to 12 inches, the largest monthly total, 16.7 inches, being reported from Pensacola, Fla. Over most districts from the middle

Plains eastward the rainfall was above 2 inches, and from 2 to 4 inches, or slightly more, occurred in portions of Arizona, New Mexico, and Colorado. The middle and northern portions of the western Plains region had little rain during the month, and there was a very general absence of any beneficial rain thence westward to the Pacific. At the end of the month severe drought still persisted in many parts of the far West and Northwest. In portions of southern Idaho and adjoining regions there has been no beneficial precipitation since May, and at some points the drought period has extended over a longer time than ever before known. As a result all vegetation, except where irrigated, is entirely dry, and the ranges afford no feed save at the higher elevations. Over most eastern districts the soil moisture at the end of the month was sufficient. In fact, over portions of the Gulf States the ground continued too wet throughout the entire month for proper cultivation of the soil, and considerable damage to crops resulted. In much of the Plains region and thence west to the Pacific, except in portions of the Southwest, the soil was everywhere exceedingly dry at the end of the month.

RELATIVE HUMIDITY.

From the upper Ohio Valley eastward and northeastward to the Atlantic coast and over the southern tier of States from ocean to ocean, the relative humidity was generally higher than normal, although the excess was small in practically all sections. In the central valleys and thence west to the Pacific coast the average humidity was nearly everywhere less than usual, the deficiency being quite large in localities where severe drought existed.

SEVERE STORMS.

The month was unusually free from extensive storm areas, and local thunderstorms were mostly without damaging winds. Some high winds were experienced along the middle Atlantic coast on the 13th and 14th, when corn was badly beaten down and fruit blown from trees. (See pp. 565-566.)

In Arizona severe storms were reported on the 23d and 30th, and much damage to buildings and crops was reported. Thunderstorms were frequent in New Mexico and some of them caused material damage.

Average accumulated departures for August, 1919.

Districts.	Temperature.			Precipitation.			Cloudiness.		Relative Humidity.	
	General mean for the current month.	Departure for the current month.	Accumulated departure since Jan. 1.	General mean for the current month.	Departure for the current month.	Accumulated departure since Jan. 1.	General mean for the current month.	Departure from the normal.	General mean for the current month.	Departure from the normal.
	° F.	° F.	° F.	In.	In.	In.	0-10		Perc.	
New England.....	65.5	-1.5	+14.4	4.01	+0.10	+1.01	5.9	+0.8	80	-1
Middle Atlantic.....	71.7	-0.9	+17.8	5.39	+0.80	-0.90	5.3	+0.2	76	-1
South Atlantic.....	78.3	+0.5	+ 8.2	5.15	-1.00	-1.30	5.8	+0.6	80	-2
Florida Peninsula....	83.2	+0.7	- 2.9	2.94	-4.00	+6.10	5.5	+0.1	75	-4
East Gulf.....	79.8	+0.7	- 0.4	7.77	-0.30	+4.96	6.3	+1.2	83	+3
West Gulf.....	81.9	+0.9	- 8.5	3.22	+0.20	+2.50	4.3	+0.4	76	+1
Ohio Valley and Tennessee.....	74.0	-0.5	+ 9.4	3.54	+1.10	-1.10	4.8	+0.3	72	-1
Lower Lakes.....	68.7	-0.9	+17.1	3.96	+1.00	-0.30	5.4	+0.2	70	-2
Upper Lakes.....	66.9	+0.7	+27.0	2.04	-0.90	-3.00	4.9	+0.1	73	-3
North Dakota.....	68.7	+2.0	+27.2	1.80	-0.50	-1.85	3.1	-1.1	62	-5
Upper Mississippi Valley.....	72.5	-0.5	+17.9	2.60	-0.60	-0.80	3.9	-0.4	69	-2
Missouri Valley.....	74.8	-1.0	+18.9	3.09	-0.30	-3.00	4.0	-0.2	65	-2
Northern slope.....	69.2	+2.5	+24.1	0.51	-0.80	-3.80	3.7	-0.2	48	-7
Middle slope.....	77.7	+2.4	+ 7.7	1.72	-0.70	-3.90	3.9	0.0	58	+3
Southern slope.....	80.3	+1.0	-11.5	1.96	-0.20	-2.60	3.4	-0.4	61	-2
Southern Plateau....	78.4	+1.1	+ 5.1	1.21	-0.01	+0.59	2.5	-1.1	46	+2
Middle Plateau.....	73.7	+0.2	+11.3	0.34	-0.50	-2.90	2.4	-0.6	32	-7
Northern Plateau....	72.5	+2.6	+15.0	0.42	0.00	-2.90	2.8	+0.1	35	-7
North Pacific.....	62.3	+0.4	+ 8.8	0.12	-0.70	-4.70	4.7	+0.1	74	-2
Middle Pacific.....	65.0	+0.1	- 5.3	0.09	0.00	2.00	3.7	+0.4	59	-3
South Pacific.....	71.2	-0.1	+ 5.1	0.90	0.00	3.80	2.4	-0.2	66	+1

Winds of 50 mis./1 hr. (244 m./sec.) or more, during August, 1919.

Station.	Date.	Velocity.	Direction.	Station.	Date.	Velocity.	Direction.
Block Island, R. I..	14	56	ne.	Mount Tamalpais,			
Cairo, Ill.....	13	57	n.	Calif.....	26	56	nw.
Columbus, Ohio....	16	53	nw.	Do.....	27	73	nw.
Dayton, Ohio.....	16	57	w.	Do.....	28	76	nw.
Ellendale, N. Dak..	12	52	n.	Nashville, Tenn...	31	50	w.
Evansville, Ind....	1	53	nw.	Norfolk, Va.....	13	50	nw.
Do.....	5	50	sw.	Point Reyes Light,			
Indianapolis, Ind..	20	50	sw.	Calif.....	27	53	nw.
Do.....	24	52	w.	St. Joseph, Mo....	7	50	w.
Lincoln, Nebr.....	12	51	nw.	St. Louis, Mo.....	20	50	sw.
Do.....	4	70	nw.	Sandy Hook, N. J..	13	54	ne.
Little Rock, Ark...	14	52	w.	Do.....	14	53	n.
Louisville, Ky.....	20	54	w.	Toledo, Ohio.....	30	53	w.
Mount Tamalpais,				Topeka, Kans.....	26	56	se.
Calif.....	23	54	nw.	Trenton, N. J.....	14	51	n.
Do.....	24	57	nw.	Valentine, Nebr...	3	56	w.
Do.....	25	52	nw.				